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# RECENT MEETINGS

**The following is a listing of the programs of recent meetings during which ground-water papers were presented. All readers are encouraged to submit information for future lists.**

## THE SOCIETY OF MINING ENGINEERS OF AIME

**Fall Meeting** – Salt Lake City, Utah, September 11-13, 1963

The Society, a constituent organization of the American Institute of Mining, Metallurgical and Petroleum Engineers, is the professional body in the United States for engineers and geologists in the minerals industries. Its Fall Meeting was in conjunction with the Rocky Mountain Minerals Conference. The geothermal panel was held the morning of September 12 in the Hotel Utah, and took up geologic, legal, and engineering phases.

In announcing the panel and emphasizing its significance, the Society's Mining and Exploration Division said:

"Utilization of thermal steam – natural steam from the earth – for generation of electricity on a commercial scale has been demonstrated in the Western States. This natural resource represents a source of energy whose potential is yet to be realized.

"Development of a low-cost source of power for mining in areas which have a geothermal power potential, has an important economic significance. Geologic conditions in California, Nevada, Utah and Oregon make them promising areas for development of geothermal power. At least thirteen areas in California, Nevada and Oregon have been investigated as possible sources of such energy. One such area in California produces steam of sufficient pressure to run turbine generators. Enough electricity is being produced from the California plant to serve a community of 20,000 people.

"The feasibility of utilization of natural steam has been demonstrated at Larderello, Italy, which produces over 300,000 kilowatts of electricity, and in New Zealand on a somewhat smaller scale. Russia and Mexico are producing electricity from geothermal steam.

"Important by-products have been encountered in drilling for natural steam. In the Italian fields, boric acid, borax, carbon dioxide, boron carbide, and sulfur are produced from geothermal steam. In the Imperial Valley, California, deep well drilling has yielded steam with a flow of brine of 500,000 pounds per hour. The brine contains gold, silver, copper, and other minerals."

At the panel session, Dr. James R. McNitt, Geologist, California Division of Mines & Geology, described world occurrences and compared geologic features with local occurrences in California and Nevada. Structural controls and genesis of the steam were discussed.

George W. Abbott, of Minden, Nevada, former Assistant Secretary of the Interior, reviewed the methods of acquisition of geothermal rights on private property, the present difficulties of acquiring rights on public lands and pending legislation bearing on this question. Unitization, communitization, and water rights also were discussed.

Ross W. Whipple, consulting geophysicist, of Sunnyvale, California, spoke on geophysical methods useful in exploring possible steam sources and their specific applications.

William M. Middleton, of San Francisco, Chief Engineer, Thermal Power Co., discussed the engineering aspects involved.

## NATIONAL WATER WELL ASSOCIATION

**1963 Exposition** – San Francisco, California, September 29-October 3, 1963

### SEPTEMBER 30
### 1ST TECHNICAL SESSION
### GROUND-WATER HYDROLOGY

**Analysis of Current Meter Data by Flow Distribution Curves**
Gilbert W. Leve, Geologist, U. S. Geological Survey, Jacksonville, Florida

**Optimum Depth of Water Wells in Crystalline Rocks**
Stanley N. Davis, Associate Professor of Geology, and L. J. Turk, Graduate Student, Department of Geology, Stanford University

**Hydraulic Characteristics of Fractured and Jointed Rock**
D. C. Lewis, Assistant Research Irrigation Engineer, and R. H. Burgy, Associate Professor of Irrigation and Engineering, Department of Irrigation, University of California, Davis, California

**Understanding Chemical Analysis of Ground Water**
R. A. Krieger, Chemist, U. S. Geological Survey, Columbus, Ohio

**Ground-Water Pollution Hazards from Movements of Gases Produced during Refuse Decomposition through Adjacent and Underlying Soils**
Harvey F. Ludwig, Ralf C. Carter, and William D. Bishop, Engineering Science, Inc., Arcadia, California

**Temperature and Phosphates as Ground-Water Tracers**
Felix F. Sampayo and Harvey R. Wilke, Purdue University, Lafayette, Indiana

### 2ND TECHNICAL SESSION
### GROUND-WATER MODELS

**Ground-Water Models – Hydraulic, Mathematical, Electrical and Electronic**
C. E. Jacob, President, C. E. Jacob and Associates, Northridge, California

**Model Analysis of the Influence of Geologic Factors on the Drawdown Cones Surrounding Pumping Wells**
J. H. Lehr, Department of Geology, University of Arizona, Tucson, Arizona

**Electric Analog Computers and Hydrogeologic System Analysis in Illinois**
William C. Walton, Engineer, Illinois State Water Survey, Urbana, Illinois

**Resistance Network Analogs in Analyzing Ground-Water Problems**
Herman Bouwer, Research Hydraulic Engineer, ARS-USDA, U. S. Water Conservation Laboratory, Tempe, Arizona

**Use of Electronic Computers in Simulation of Ground-Water Basins**
Ernest M. Weber, Senior Engineering Geologist, California State Department of Water Resources, and Hal M. Tyson, Advisory Systems Engineer, Data Processing Division, IBM Corporation, Los Angeles, California

**The Hele-Shaw Model as a Tool in Ground-Water Research**
Yaron Sternberg, Research Assistant, and Verne Scott, Professor of Irrigation and Engineering, Department of Irrigation, University of California, Davis, California .

**OCTOBER 2**
**1ST GENERAL SESSION**
**The Problem of Integrating Ground-Water and Surface-Water Use**
Morton W. Bittinger, Civil Engineering Section, Colorado State University, Fort Collins, Colorado

**Ground-Water Recharge Hydrology**
Leonard Schiff, Recharge Research Leader, ARS-USDA, Fresno, California

**Design and Operating Criteria of Recharge Wells**
Frederick D. Seares, Civil Engineering Associate, Water Conservation District, Los Angeles County Flood Control District, Los Angeles, California

**Salvaging Water at Desert Springs**
R. H. Knaggs, California Public Utilities Commission, Los Angeles, California

**Water Resource Management in the Prospect Valley Area, Colorado**
Morris M. Skinner, Civil Engineering Section, Colorado State University, Fort Collins, Colorado

**OCTOBER 3**
**2ND GENERAL SESSION**
**Progress in the Water Well Construction Industry**
S. T. Guardino, Vice President, Western Well Co., San Jose, California

**State Water Projects**
Alfred R. Golze, Chief Engineer, Department of Water Resources, Sacramento, California

**Recharge Wells; Construction and Maintenance**
James C. Valliant, Associate Water Engineer, High Plains Research Foundation, Plainview, Texas

**Wholesaling**
J. L. Manning, President, Colorado Pump and Supply Co., and Chairman of the WEWAS Division, Denver, Colorado

**OCTOBER 4**
**TECHNICAL DIVISION FIELD TRIP**
**Schedule for Tour of Water Conservation Facilities of Santa Clara Valley Water Conservation District and Mission Santa Clara**

8:00 A.M. Leave Jack Tar Hotel
9:30 A.M. Arrive United States Geological Survey subsidence recording station — 12th & Martha Sts., San Jose
10:00 A.M. Leave subsidence recording station
10:30 A.M. Arrive at Leroy Anderson Dam
10:45 A.M. Leave Leroy Anderson Dam
11:30 A.M. Arrive Santa Clara Valley Water Conservation District Headquarters — Pass Calero Dam en route
12:00 Noon Leave Headquarters for Villa Felice, passing Los Capitancillos, Kooser, Camden-Parr, and Lahey percolation areas en route
12:30 P.M. Arrive at Villa Felice for lunch
2:30 P.M. Leave Villa Felice for Mission Santa Clara — passing Page and McGlincey percolation ponds
3:00 P.M. Arrive at Mission Santa Clara for conducted tour of Mission, Mission gardens, and University of Santa Clara campus
3:45 P.M. Leave Mission Santa Clara
5:15 P.M. Arrive Jack Tar Hotel

## GEOLOGICAL SOCIETY OF AMERICA

**Partial Program of the New York Meeting** — November 17-20, 1963

**NOVEMBER 19**
**HYDROGEOLOGY AND ENGINEERING GEOLOGY**
**Application of Quantitative Mapping Technique to Aid in Hydrologic-Systems Analysis of Alluvial Aquifer**
Patrick A. Domenico and David A. Stephenson

**Relationship of Fracture Zones to Occurrence of Ground Water**
Lawrence H. Lattman and Richard R. Parizek

**Geochemical Aspects of Hydrologic-Systems Analysis for Two Areas in Nevada**
Philip Cohen

**Permeability Variations in Carbonate Shelf Rocks of Southeastern New Mexico**
Ward S. Motts

**Geohydrological and Geophysical Investigations near Izmir, Turkey**
William H. Bierschenk

**NOVEMBER 20**
**HYDROGEOLOGY**
**Ground-Water Contamination in an Urban Environment**
James E. Hackett

**Natural Controls Involved in Shallow-Aquifer Contamination**
Morris Deutsch

**Relationships of Fresh and Salty Ground Water along the Southeastern Atlantic Coast of United States**
Joseph T. Callahan and Robert L. Wait

**Relationships of Fresh and Salty Ground Water along the Northern Atlantic Coast of the United States**
Joseph E. Upson

**Hydrologic Aspects of Disposal of Oil-Field Brines in Texas**
Leslie G. McMillion

**Hydrologic Aspects of the Oil-Field Brines in Alabama**
Doyle B. Knowles

**Hydrogeologic Factors in Problems of Contamination in Arid Lands**
G. B. Maxey and R. N. Farvolden

**Geology and Hydrology of Western New York Nuclear Service Center**
John G. Broughton and Herbert G. Stewart

**Relation of Carbon$^{14}$ Concentrations to Saline-Water Contamination of Coastal Aquifers**
Bruce B. Hanshaw, William Back and Meyer Rubin

## EIGHTH ANNUAL MIDWEST GROUND-WATER CONFERENCE

**Sponsored by Geological Survey Division, Michigan Department of Conservation and Institute of Water Research, Department of Geology, Michigan State University** – W. K. Kellogg Biological Station, Hickory Corners, Michigan, December 4-6, 1963

### DECEMBER 5

**Presiding** – Kenneth Vanlier, Geologist, U. S. Geological Survey, Michigan

**Welcome and Introductory Remarks**
Laurence Quill, Director, Institute of Water Research

**Spring Recharge from Snow Melt under Three Forest Cover Conditions**
Dean Urie, U. S. Forest Service

**Rainfall Accretion**
William Keck, Geophysicist, W. G. Keck and Associates, Inc.

**Equilibrium Yield by Induced Infiltration**
Charles Linck, Hydrologist, Lansing Board of Water and Electric Light Commissioners

**Infiltration in the Santa Clara Valley, California**
Robert Roll, Chief Engineer, Santa Clara Valley Conservation District

**Discussion**
Morris Deutsch, U. S. Geological Survey, Midcontinent Area Project Office WRD

**Discussion of Field Trip**
Morris Deutsch

**Field Trip**
Induced Infiltration Fields, Kalamazoo, Michigan

**Glaciological Program of the American Mt. Everest Expedition**
Dr. Maynard Miller

### DECEMBER 6

**Presiding** – Dr. William Hinze

**Pesticides in Ground and Surface Waters of Van Buren County, Michigan**
Gerth Hendrickson, District Geologist, U. S. Geological Survey, Michigan

**Removal of ABS and Other Sewage Components by Infiltration Through Natural Soils**
C. H. Wayman and H. G. Page, U. S. Geological Survey, Federal Center, Denver

**Theoretical Considerations on the Spread of Contaminants in Ground Water**
Harold Henry, Civil Engineering Department, Michigan State University

**Discussion**
Ralph Purdy, Michigan Water Resources Commission

**Universities Council on Hydrology**
Laurence Quill, Institute of Water Research, Michigan State University

## AMERICAN SOCIETY OF AGRICULTURAL ENGINEERS

**Partial Program of the 1963 Winter Meeting** – Palmer House, Chicago, Illinois, December 10-13, 1963

### DECEMBER 11

### SOIL AND WATER – DRAINAGE

**Tile Spacing Prediction Based on Drain Outflow**
G. J. Hoffman, Research Assistant, Agricultural Engineering Department, North Carolina State College; and G. O. Schwab, Professor, Agronomy Department, Ohio State University

**Alfalfa Growth as Influenced by Static and Fluctuating Water Tables**
Rhip Tovey, Research Agricultural Engineer, ARS, USDA

**Soil and Stratigraphic Considerations in a Study of Drainage by Wells**
Leonard Schiff, Hyd. Engr., ARS, USDA

**Studies of the Drainage of Sloping Land by the Hele-Shaw Model**
John Guitjens, Senior Engineering Aide; and J. N. Luthin, Professor, Irrigation and Engineering, University of California

### DECEMBER 12

### SOIL AND WATER – IRRIGATION

**Water Budget**
Sterling Davis, Research Agricultural Engineer, ARS, USDA; W. J. Pugh, Engineering Aide, Colorado State University; and F. M. Willhite, Soil Scientist, ARS, USDA

**A Quasi-Rational Method of Border Irrigation Design**
D. G. Shockley, Irrigation Engineer; H. J. Woodward, Assistant Irrigation Engineer; J. T. Phelan, Assistant Director, Engineering Division, SCS, USDA

**Theoretical Analyses of Surface Irrigation**
V. E. Hansen, Director, Engineering Experiment Station, Utah State University

**Dimensional Analysis Leading to More Efficient Application of Irrigation Water**
C. C. Bowman, Head, Agricultural Engineering Department, Montana State College

**Mechanics of Water Movement over a Porous Bed**
D. L. Bassett, Associate Agricultural Engineer, Washington State University; D. L. Collins, Hydraulic Engineer, USDI; and W. E. Kruger, Graduate Teaching Assistant, Civil Engineering Department, University of Iowa

### DECEMBER 13

### SOIL AND WATER – IRRIGATION

**Mapping Soils on the Basis of Total Available Moisture Capacity through Aerial Photo Interpretation**
R. N. Fenzl, Assistant Professor, Agricultural Engineering Department, University of Illinois; and Gilbert Levine, Associate Professor, Agricultural Engineering Department, Cornell University

**The Effect of Water Application Rate on Soil Structure**
Jack Keller, Assistant Professor, Civil and Irrigation Engineering, Utah State University

### SOIL AND WATER – HYDROLOGY

**Observations on Vertical Water Movements During Artificial Ground-Water Recharge Operations**
W. C. Bianchi, Research Soil Scientist; and E. E. Haskell, Jr., Geologist, ARS, USDA

**Sediment Removal from Flood Water by Grass Filtration**
L. G. Wilson, Assistant Hydrologist, University of Arizona

**An Electric Analog Model Study of a Sand and Gravel Aquifer in the East St. Louis Area, Illinois**
R. J. Schicht, Associate Engineer, Illinois State Water Survey

**Ground and Surface Water Relationships Studied by Statistical Techniques**
R. A. Longenbaugh, Jr., Civil Engineer; and M. W. Bittinger, Associate Professor, Agricultural Engineering Department, Colorado State University

**Occurrence and Use of Water Resources in the High Plains of Texas and New Mexico**
Wayne Clyma, Agricultural Engineer; and F. B. Lotspeich, Research Soil Scientist, ARS, USDA

# MEETING CALENDAR

by R. T. Sasman
Illinois State Water Survey
Naperville, Illinois

**The following are coming meetings of interest to those in the field of ground water:**

**Pacific Southwest Regional AGU Meeting, University of California, Los Angeles, California, January 30-31, 1964.**

**Nebraska State Water Well Convention, Pershing Municipal Auditorium, Lincoln, Nebraska, February 20-21, 1964.**

**2nd Annual Underground Corrosion Short Course, Purdue University, Lafayette, Indiana, February 25-26, 1964.**

**Texas Water and Sewage Works Association Annual Meeting, Texas A & M College, College Station, Texas, March 1-6, 1964.**

**Missouri State Water Well Convention, Governor Hotel, Jefferson City, Missouri, March 11-13, 1964.**

**Illinois Section AWWA Meeting, Sheraton-Chicago Hotel, Chicago, Illinois, March 17-20, 1964.**

**Irrigation and Drainage Division ASCE Specialty Conference on Research, Utah State University, Logan, Utah, March 19-21, 1964.**

**Indiana State Water Well Convention, McCudy Hotel, Evansville, Indiana, April 8-9, 1964.**

**National Environmental Engineering Conference ASCE, Hotel Utah, Salt Lake City, Utah, May 11-15, 1964.**

**Upper Midwest Water Well Exposition, Leamington Hotel, Minneapolis, Minnesota, May 25-29, 1964.**

**National Convention AWWA, Toronto, Canada, May 31-June 5, 1964.**

**Michigan State Water Well Convention, Saginaw, Michigan, June 10-11, 1964.**

**Hydraulics Division ASCE Conference, Vicksburg, Mississippi, November, 1964.**

# NEW PUBLICATIONS

**The following is a bibliographical listing of ground-water papers and reports, and special announcements that have come to the attention of the editor since the last issue. Inclusion or noninclusion of a paper in the lists does not imply any degree of endorsement by the National Water Well Association or the editor. All readers are encouraged to submit information for future lists. The comprehensive bibliography and special announcements, if properly used, can greatly expand the readers' understanding of ground water.**

**Adams, J. K. and D. H. Boggess, 1963**
*Water-Table, Surface-Drainage, and Engineering Soils Map of the St. Georges Area, Delaware.* U. S. Geological Survey Hydrologic Investigations Atlases. HA-60.

**Anon., 1963**
*Annotated Bibliography of Economic Geology for January-June 1962.* The Economic Geology Publishing Company. V. 35, No. 1.

**Anon., 1963**
*Basic Principles of Water Well Design.* The Johnson Drillers Journal. July-August.

**Anon., 1963**
*Basic Principles of Water Well Design – Selection of Screen Diameter and Metal.* The Johnson Drillers Journal. Sept.-Oct.

**Anon., 1963**
*Deep Test Wells Give Valuable Data.* The Johnson Drillers Journal. Sept.-Oct.

**Anon., 1963**
*Ground-Water Levels in the United States, 1956-60, Northwestern States.* U. S. Geological Survey Water Supply Paper 1760.

**Anon., 1963**
*Ground-Water Levels in the United States, 1956-60, Southwestern States.* U. S. Geological Survey Water Supply Paper 1770.

**Anon., 1963**
*List of Current Research in Water Resources at the University of Arizona.* University of Arizona, Tucson.

**Anon., 1962**
*Protecting Our Water Resources; the Federal Water Pollution Control Program.* U. S. Public Health Service, Washington, D. C.

**Anon., 1963**
*Radioactive Tracers Assist Ground-Water Studies.* The Johnson Drillers Journal. Sept.-Oct.

**Anon., 1963**
*Report of the Committee on the Education and Training of Hydrologists.* Journal of the Institution of Water Engineers. V. 17, No. 5.

**Anon., 1963**
*Water Costs and Pumping Conditions for Thirty Selected*

*Wells in San Benito County.* Agricultural Extension Service, San Benito County, University of California.

**Anon., 1962**
*Water Resources Symposium, Extension News Bulletin.* University of Alabama, University.

**Arnow, Ted, 1963**
*Ground-Water Geology of Bexar County, Texas.* U. S. Geological Survey Water Supply Paper 1588.

**Ash, S. R., 1963**
*Ground-Water Conditions in Northern Lea County, New Mexico.* U. S. Geological Survey Hydrologic Investigations Atlases. HA-62.

**Barnes, C. and G. J. Geifer, 1963**
*Index to Periodical Literature on Aspects of Water in California.* Water Resources Center Archives Report No. 14. University of California, Berkeley.

**Behnke, J. J. and Leonard Schiff, 1963**
*Hydraulic Conductivity of Uniform, Stratified, and Mixed Sands.* Journal of Geophysical Research. V. 68, No. 16.

**Bell, E. A., R. W. Kellogg and W. K. Kulp, 1963**
*Progress Report on the Ground-Water Resources of the Louisville Area, Kentucky, 1949-55.* U. S. Geological Survey Water Supply Paper 1579.

**Bouwer, Herman, 1963**
*Theoretical Effect of Unequal Water Levels on the Infiltration Rate Determined with Buffered Cylinder Infiltrometers.* Journal of Hydrology 1. North-Holland Publishing Co., Amsterdam.

**Broom, M. E. and J. H. Irwin, 1963**
*Records, Logs, and Water-Level Measurements of Selected Wells and Test Holes, and Chemical Analyses of Ground Water in Bent County, Colorado.* Colorado Water Conservation Board.

**Bureau of Sanitary Engineering, 1963**
*Occurrence of Nitrate in Ground-Water Supplies in Southern California.* California Department of Public Health, Sacramento.

**Bureau of Sanitary Engineering, 1962**
*Stockton-Delta Area Water Quality and Water Use Supply.* California Department of Public Health, Sacramento.

**Cardwell, W. D. E. and E. D. Jenkins, 1963**
*Ground-Water Geology and Pump Irrigation in Frenchman Creek Basin Above Palisade, Nebraska.* U. S. Geological Survey Water Supply Paper 1577.

**Cohen, Philip, 1963**
*Specific-Yield and Particle-Size Relations of Quaternary Alluvium, Humboldt River Valley, Nevada.* U. S. Geological Survey Water Supply Paper 1669-M.

**Conover, C. S., C. V. Theis and R. L. Riggs, 1963**
*Geology and Hydrology of Valle Grande and Valle Toledo, Sandoval County, New Mexico.* U. S. Geological Survey Water Supply Paper 1619-Y.

**Davidson, J. M., J. W. Biggar and D. R. Nielsen, 1963**
*Gamma-Radiation Attenuation for Measuring Bulk Density and Transient Water Flow in Porous Materials.* Journal of Geophysical Research. V. 68, No. 16.

**Davis, D. A., 1963**
*Ground-Water Reconnaissance of American Samoa.* U. S. Geological Survey Water Supply Paper 1608-C.

**Division of Resources Planning, 1963**
*Desert Areas of Southeastern California, Land and Water Use Survey, 1958.* California Department of Water Resources, Sacramento. Bulletin No. 101.

**Division of Resources Planning, 1962**
*Feasibility of Serving the Desert Water Agency Service Area from the State Water Facilities.* California Department of Water Resources, Sacramento. Bulletin No. 119-1.

**Division of Resources Planning, 1963**
*Ground-Water Conditions in Central and Northern California, 1959-60.* California Department of Water Resources, Sacramento. Bulletin No. 77-60.

**Division of Resources Planning, 1962**
*Land and Water Use in the Tule River Hydrographic Unit.* California Department of Water Resources, Sacramento. Bulletin No. 94-1.

**Division of Resources Planning, 1962**
*Land and Water Use in Trinity River Hydrographic Unit.* California Department of Water Resources, Sacramento. Bulletin No. 94-2.

**Division of Resources Planning, 1962**
*Tuolunne County Water District No. 2 Investigation.* California Department of Water Resources, Sacramento. Bulletin No. 95.

**Erdelyszky, Zs. and K. Ubell, 1962**
*Experiments for Determining the Variations of Ground-Water Flow Velocity with Depth.* Periodica Polytechnica, Electrical Engineering. V. 6, No. 3. Budapest.

**Gallaher, J. T., 1963**
*Geology and Hydrology of Alluvial Deposits Along the Ohio River in the Hawesville and Cloverport Areas, Kentucky.* U.S. Geological Survey Hydrologic Investigations Atlases. HA-72.

**Gardner, W. R. and C. F. Ehlig, 1963**
*The Influence of Soil Water on Transpiration by Plants.* Journal of Geophysical Research. V. 68, No. 20.

**Gates, J. S., 1963**
*Hydrogeology of Middle Canyon, Oquirrh Mountains, Tooele County, Utah.* U. S. Geological Survey Water Supply Paper 1619-K.

**Hardison, C. H. and R. O. R. Martin, 1963**
*Low-Flow Frequency Curves for Selected Long-Term Stream-Gaging Stations in Eastern United States.* U. S. Geological Survey Water Supply Paper 1669-G.

**Harmon, John, 1963**
*Aquifer Performance Evaluation.* Water and Sewage Works. Sept.

**Harvey, E. J., 1963**
*Compilation of Aquifer Test Data for Mississippi.* Mississippi Board of Water Commissioners Bulletin.

**Hoxie, E. C., 1963**
*Corrosion of Well Points and Piping in Domestic Water Near AEC Plant.* Materials Protection. V. 2, No. 10.

**Jones, P. B., G. D. Walker, R. W. Harder, and L. L. McDaniels, 1963**
*The Development of the Science of Hydrology.* Texas Water Commission, Austin. Circular No. 63-03.

**Karr, W. V., 1963**
*Water Blending Techniques.* Iron and Steel Engineer. Oct.

**Kawabata, Hiroshi, 1963**
*Area of Strainer.* Bulletin of the Kyoto Gakugei University. Ser. B, No. 22.

**Kawabata, Hiroshi, 1963**
*Flow of Liquid in Capillary Zone.* Bulletin of the Kyoto Gakugei University. Ser. B, No. 22.

**Landsberg, H. H., L. L. Fischman and J. L. Fisher, 1963**
*Resources in America's Future.* The John Hopkins Press, Baltimore 18, Maryland.

**Lawrence, R. E. and R. H. Hess, 1963**
*Wichita's Past, Present, and Future Water Supply.* Journal American Water Works Association. V. 55, No. 8.

**Liesch, B. A., C. E. Price and K. L. Walters, 1963**
*Geology and Ground-Water Resources of Northwestern King County, Washington.* Washington Department of Conservation, Tacoma.

**Loeltz, O. J., 1963**
*Ground-Water Conditions in the Vicinity of Lake Mead Base, Las Vegas Valley, Nevada.* U. S. Geological Survey Water Supply Paper 1669-Q.

**Lofting, E. M. and P. H. McGauhey, 1963**
*Economic Evaluation of Water, Part III, an Interindustry Analysis of the California Water Economy.* University of California, Berkeley. Water Resources Contribution No. 67.

**Malmer, Reynold, 1963**
*Down the Hole TV.* Water Well Journal. V. 17, No. 10.

**Maxey, G. B. and J. E. Hackett, 1963**
*Applications of Geohydrologic Concepts in Geology.* Journal of Hydrology 1. North-Holland Publishing Co.

**McGinnis, L. D., J. P. Kempton and P. C. Heigold, 1963**
*Relationship of Gravity Anomalies to a Drift-Filled Bedrock Valley System in Northern Illinois.* Illinois State Geological Survey. Circular 354.

**McGuinness, C. L., 1963**
*The Role of Ground Water in the National Water Situation.* U. S. Geological Survey Water Supply Paper 1800.

**Mobasheri, F. and D. K. Todd, 1963**
*Investigation of the Hydraulics of Flow Near Recharge Wells.* Hydraulics Laboratory, University of California, Berkeley. Water Resources Center Contribution No. 72.

**Mundorff, M. J. and H. G. Sisco, 1963**
*Ground Water in the Raft River Basin, Idaho, with Special Reference to Irrigation Use, 1956-60.* U. S. Geological Survey Water Supply Paper 1619-CC.

**Newport, T. G. and Yousef Haddor, 1963**
*Ground-Water Exploration in Al Marj Area, Cyrenaica, United Kingdom of Libya.* U. S. Geological Survey Water Supply Paper 1757-A.

**Norvitch, R. F., Robert Schneider and R. G. Godfrey, 1963**
*Geology and Hydrology of the Elk River, Minnesota Nuclear-Reactor Site.* U. S. Geological Survey Bulletin 1133-C.

**Öllös, G. and K. Ubell, 1961**
*Relation Between Discharge and Hydrodynamic Conditions in the Vicinity of the Well.* I.A.S.H. Ground Water in Arid Zones. Publication No. 57.

**Outmans, H. D., 1963**
*On Unique Solutions for Steady-State Fingering in a Porous Medium.* Journal of Geophysical Research. V. 68, No. 20.

**Page, H. G., 1963**
*Water Regimen of the Inner Valley of the San Pedro River Near Mammoth, Arizona.* U. S. Geological Survey Water Supply Paper 1669-I.

**Perlmutter, N. M. and F. A. DeLuca, 1963**
*Availability of Fresh Ground Water, Montauk Point Area, Suffolk County, Long Island, New York.* U. S. Geological Survey Water Supply Paper 1613-B.

**Preuss, F. A. and D. K. Todd, 1963**
*Specific Yield of Unconsolidated Alluvium.* University of California, Berkeley. Water Resources Contribution No. 76.

**Reisenauer, A. E., 1963**
*Methods for Solving Problems of Multidimensional Partially Saturated Steady Flow in Soils.* Journal of Geophysical Research. V. 68, No. 20.

**Russell, R. R., 1963**
*Ground-Water Levels in Illinois Through 1961.* Illinois State Water Survey. Report of Investigation 45.

**Schiner, G. R., 1963**
*Ground-Water Exploration and Test Pumping in the Halma-Lake Bronson Area, Kittson County, Minnesota.* U. S. Geological Survey Water Supply Paper 1619-BB.

**Schufle, J. A. and J. E. Fletcher (Editors), 1961**
*Symposium on Water Improvement.* American Association for the Advancement of Science.

**Scott, G. T. G., 1963**
*Water Resources Control Legislation in Great Britain.* Journal American Water Works Association. V. 55, No. 8.

**Sniegocki, R. T. and J. E. Reed, 1963**
*Principles of Siphons with Respect to the Artificial-Recharge Studies in the Grand Prairie Region, Arkansas.* U. S. Geological Survey Water Supply Paper 1615-D.

**Sunada, D. K. and D. K. Todd, 1963**
*Radial Flow Behavior of Artificial Recharge from Surface Cavities.* Hydraulic Laboratory, University of California, Berkeley.

**Swenson, H. A., 1963**
*Purpose and Operation of USGS Water Quality Networks.* Journal American Water Works Association. V. 55, No. 8.

**Sylvester, R. O. and R. W. Seabloom, Jr., 1963**
*Quality and Significance of Irrigation Return Flow.* Journal of the Irrigation and Drainage Division ASCE. V. 89, No. IR3.

**Tanaka, H. H. and L. V. Davis, 1963**
*Ground-Water Resources of the Rush Springs Sandstone in the Caddo County Area, Oklahoma.* Oklahoma Geological Survey Circular.

**Tarney, J. R. and H. H. Ellis, 1962**
*State Water-Rights Laws and Related Subjects: A Bibliogra-*

*phy.* U. S. Department of Agriculture, Washington, D. C. Miscellaneous Publication No. 921.

**Taylor, E. F., 1963**
*States Rights in Water Law.* Journal American Water Works Association. V. 55, No. 8.

**Toth, J., 1963**
*A Theoretical Analysis of Ground-Water Flow in Small Drainage Basins.* Journal of Geophysical Research. V. 68, No. 16.

**Ubell, K., 1961**
*Ground-Water Recharge by Direct Infiltration of Rainfall.* I.A.S.H. Ground Water in Arid Zones. Publication No. 57.

**Ubell, K., 1959**
*Moisture Movement in Unsaturated (Three Phase) Soils, With Special Regard to the Utilization of Hysimeter Observations.* A.I.H.S. Publication No. 49.

**Ubell, K., 1961**
*Vertical-Velocity Curve for Ground-Water Flow by Small Gradient.* IAHR-Ninth Convention-Belgrade.

**Walker, G. E. and T. E. Eakin, 1963**
*Geology and Ground Water of Amargosa Desert, Nevada-California.* Nevada Department of Conservation and Natural Resources.

**Ware, W. H., 1963**
*Digital Computer Technology and Design.* Mathematical Topics, Principles of Operation and Programming. John Wiley & Sons, Inc., New York. V. 1.

**Water Commission, 1963**
*Recommendations on Water Policy and Legislation; a Report to the Governor and 105th General Assembly.* Ohio Department of Natural Resources, Columbus.

**Watkins, F. A., Jr. and J. S. Rosenshein, 1963**
*Ground-Water Geology and Hydrology of Bunker Hill Air Force Base and Vicinity, Peru, Indiana.* U. S. Geological Survey Water Supply Paper 1619-B.

**Weist, W. G., Jr., 1963**
*Water in the Dakota and Purgatoire Formations in Otero County and the Southern Part of Crowley County, Colorado.* U. S. Geological Survey Water Supply Paper 1669-P.

**Willardson, L. S. and W. L. Pope, 1963**
*Separation of Evapotranspiration and Deep Percolation.* Journal of the Irrigation and Drainage Division ASCE. V. 89, No. IR3.

**Wolman, Abel, 1963**
*Status of Water Resources Use, Control, and Planning in the United States.* Journal American Water Works Association. V. 55, No. 10.

**Worts, G. F., Jr., 1963**
*A Brief Appraisal of Ground-Water Conditions in the Coastal Artesian Basin of British Guiana, South America.* U. S. Geological Survey Water Supply Paper 1663-B.

**Youngs, E. G. and D. E. Smiles, 1963**
*The Pumping of Water from Wells in Unconfined Aquifers: A Note on the Applicability of Theis' Formula.* Journal of Geophysical Research. V. 68, No. 20.

## SPECIAL ANNOUNCEMENTS

**United States Department of the Interior**
**Geological Survey**
**Water Resources Division**
**Washington 25, D. C.**

**The U. S. Geological Survey is endeavoring by means of Professional Papers to publish quickly the significant results of current work dealing with ground water. Professional Paper 475-C titled "Geological Survey Research 1963 Short Papers in Geology and Hydrology Articles 60-121" contains several short papers on ground water. The Professional Paper may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. 20402, at $2.00 per copy. Titles and authors of articles pertaining to ground water in Professional Paper 475-C are given below:**

*Movement of Waterborne Cadmium and Hexavalent Chromium Wastes in South Farmingdale, Nassau County, Long Island, New York,* by N. M. Perlmutter, Maxim Lieber, and H. L. Frauenthal.

*Mapping Transmissibility of Alluvium in the Lower Arkansas River valley, Arkansas,* by M. S. Bedinger and L. F. Emmett.

*Graphical Multiple-Regression Analysis of Aquifer Tests,* by C. T. Jenkins.

*Adsorption of the Surfactant ABS$^{35}$ on illite,* by C. H. Wayman, H. G. Page, and J. B. Robertson.

*Biodegradation of Surfactants in Synthetic Detergents Under Aerobic and Anaerobic Conditions at 10° C,* by C. H. Wayman and J. B. Robertson.

*Effect of Urbanization on Storm Discharge and Ground-Water Recharge in Nassau County, New York,* by R. M. Sawyer.

**United States Department of Health, Education, and Welfare**
**Public Health Service**
**Robert A. Taft Sanitary Engineering Center**
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**HOW TO ORDER: Sec Technical Reports are available without charge to qualified users. Items may be ordered by number. When one report has been superseded by another, the latter will be furnished. Address requests to Director, Sanitary Engineering Center, USPHS, Cincinnati 26, Ohio, Attention Publications Office.**

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*Effectiveness of Halogens or Halogen-Containing Compounds in Detoxifying Clostridium Botulinum Toxins.* 44 pp.

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*Removal of Radiological, Biological, and Chemical Contaminants from Water.* 133 pp.

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*The Bacteriological and Chemical Behavior of Silver in Low Concentrations.* 18 pp.

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*Waste Disposal Aspects of Potential Pulp Mills in Western Colorado.* 16 pp.

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*Extended-Aeration Sewage Treatment.* 47 pp.

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*Water Quality Measurement and Instrumentation.* 238 pp.

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*Ground-Water Contamination.* 218 pp.

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*Controlled Environment Facilities.* 52 pp.

**W61-29**
*Stabilization Ponds for Treatment of Industrial Wastes: Inventory and Reference Material.* 35 pp.

**W61-30**
*Report on the Algae and Water Supplies of the Sao Paulo Area.* 7 pp.

**W62-2**
*Research for Clean Water.* 34 pp.

**W62-3**
*Wastes from the Poultry Processing Industry.* 40 pp.

**W62-9**
*Summary Report, June 1960 – December 1961. Advanced Waste Treatment Research-1. (AWTR-1).* 65 pp.

**W62-10**
*A Method for the Isolation and Enumeration of Actinomycetes Related to Water Supplies.* 15 pp.

**W62-12**
*Waste Guide for the Uranium Milling Industry.* 78 pp.

**W62-17**
*Process and Waste Characteristics at Selected Uranium Mills.* 94 pp.

**W62-24**
*Preliminary Appraisal of Advanced Waste Treatment Processes. (AWTR-2)* 36 pp.

**W62-25**
*Problems in Ground-Water Pollution.* 6 pp.

**W63-1**
*Publications. Section 3. Water Supply and Pollution Control.*

**Trenton, New Jersey**
**November 20, 1963**

The publication of a report, "Chloride Concentrations of Water from Wells in the Atlantic Coastal Plain of New Jersey, 1923-1961" was announced today by Robert A. Roe, Commissioner of the New Jersey Department of Conservation and Economic Development.

This basic data report lists the results of 8,957 determinations of chloride concentration in water from 884 wells in the Coastal Plain of New Jersey.

This Special Report No. 22 was written by Paul R. Seaber, Geologist, U. S. Geological Survey and prepared in cooperation with the Division of Water Policy and Supply and the Survey as part of a state-wide program of water-resources studies authorized by the 1958 Water Supply Law.

The report is intended (1) to serve as a reference framework to which short-term records collected during intensive investigations of limited areas may be related, (2) to indicate areas where saline-water encroachment has occurred, (3) to define areas of undesirable chloride concentration in the ground water as well as areas of fresh-water occurrence, and (4) to serve as a basis for possible later interpretive studies on the significance of long-term trends in chloride concentrations.

Maps of Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Mercer, Middlesex, Monmouth, Ocean, and Salem counties show locations of all the wells sampled.

Copies of the report may be obtained from the office of the Division of Water Policy and Supply, 32 East Hanover Street, Box 1390, Trenton, New Jersey, 08625.

**University of Hawaii**
**Honolulu 14, Hawaii**

**Lau, L. Stephen, 1962**
*Water Development of Kalauao Basal Springs – Hydraulic Model Studies.* Board of Water Supply, City and County of Honolulu. 102 pages. October.

This is an investigation made to determine the desirability of developing 10 MGD of the natural ground water issuing from the Kalauao Springs near Pearl Harbor, Oahu, Hawaii to meet the present and future demand for the metropolitan Honolulu. The investigation entailed the device and use of a hydraulic sand model made to simulate the field conditions, and the predication of the probable modifications of the present ground-water hydrologic condition with particular reference to sea water intrusion as caused by developing the Spring waters. The investigation was conducted and completed (during the summer months of 1962) by Stephen and his research staff at the University of Hawaii, Honolulu with the Honolulu Board of Water Supply's sponsorship.

As a result of this investigation, the Board of Water Supply has announced in January, 1963 a $12 million dollar project to develop the Kalauao waters. The first phase of this major undertaking started this fall – five years earlier than originally planned.

**Geological Survey of Alabama**
**Tuscaloosa, Alabama**
**September 19, 1963**

"Important ground-water resources for present and future industrial, domestic, and municipal use occur in Limestone County," stated P. E. LaMoreaux, State Geologist, this week in announcing publication of two booklets and extensive mapping of the ground-water resources of both the Athens area and of Limestone County. These reports bring to 16 the number of counties for which ground-water studies have been completed.

The reports on the Athens area and Limestone County describe the geology and discuss the occurrence, availability, quantity, and quality of ground water from each of the water-bearing formations. The reports include geologic maps showing the different kinds of rocks and their distribution and character, and other illustrations and tables showing geologic and hydrologic data.

**Athens Area Study**

The municipal wells and spring at Athens supply an